The Next Generation Theater Geospatial Database

U.S. Army Pacific & U.S. Army Europe Geospatial Enterprise Solution

Presented By

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The Art of War

The art of war, then, is governed by five constant factors, to be taken into account in one's deliberations, when seeking to determine the conditions obtaining in the field. These are: (1) The Moral Law; (2) Heaven; (3) Earth; (4) The Commander; (5) Method and discipline.

Earth comprises distances, great and small; danger and security; open ground and narrow passes; the chances of life and death.

Sun Tzu, 500 BC

Objectives

- What & Why of TGD
- Data Model
- Hardware / Software Architecture
- Enterprise Component (JIVA-V)
- Future Enhancements

What is the TGD

The TGD is an enterprise solution focused on providing critical vector data in support of commanders, analysts, planners and systems. The TGD will greatly improve geospatial data collection, analysis, management and dissemination via the SIPRNET.

The TGD consists of:

- **Standard data model implemented on the Army's Digital Topographic Support System (DTSS)**
- **Standard tools for creating and managing terrain analysis data (i.e., ESRI ArcGIS, ArcSDE, PLTS; ERDAS Imagine)**
- **Standard metadata scheme to enhance data discovery**
- **Geospatial data visualization and dissemination capability on the SIPRNet (JIVA-V, GLIDE, DGINet)**
- **New "Information-based" business processes**

5th EN DET

As the U.S. Pacific Command's (PACOM) Executive Agent for all Pacific Theater terrain analysis and geospatial information, U.S. Army, Pacific has established a Pacific Theater Geospatial Database (TGD). A collaborative, three year, on-going effort with U.S. Army, Europe, define(ESRI), and with support from the Topographic Engineer Center (TEC), the TGD provides a unique geospatial data production, retrieval, and storage capability at a fidelity not currently offered by any other Department of Defense system or agency.

The TGD addresses critical Homeland Security intelligence analysis requirements by consolidating and disseminating extensive Pacific Theater, unique, digital, geospatial information and products.

In addition, the TGD allows intelligence analysts, planners, and operators to integrate, seemingly disparate data to aid in pattern recognition, modeling, and visualization of the battle space.

USARPAC TGD GIS Vision

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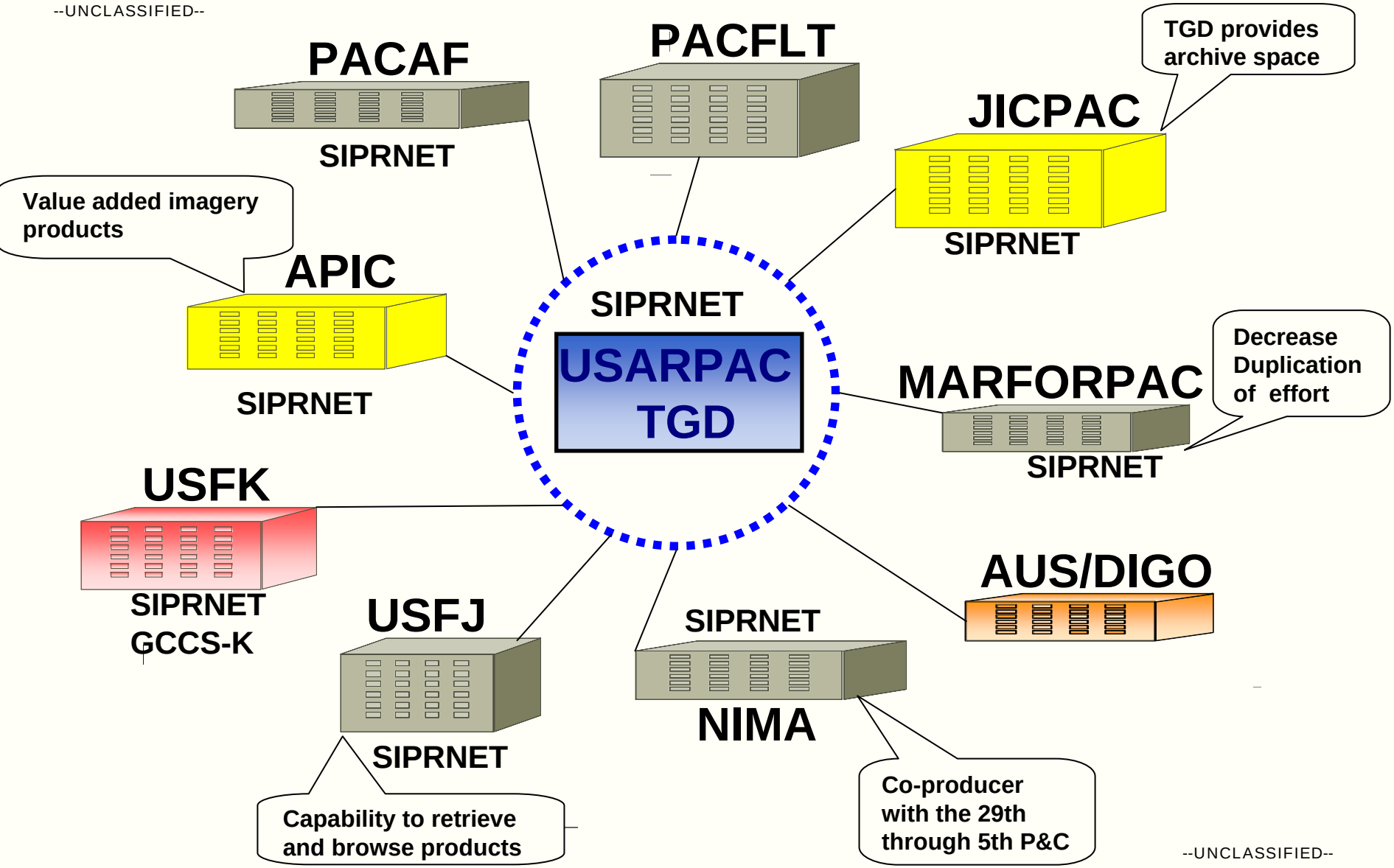

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TGD Problem Set

- There is no standardized theater geospatial database available to support geospatial and intelligence analysis during the IPB and EBA process.
- There is no effective method for sharing geospatial data with the National Geospatial-Intelligence Agency (NGA).
- Geospatial operations are “product-based” and therefore data are created, managed and disseminated in an ad hoc approach which varies from theater to theater. It’s like building cars one car at a time…
- Standard NGA datasets are incomplete and do not meet data-centric operational requirements.

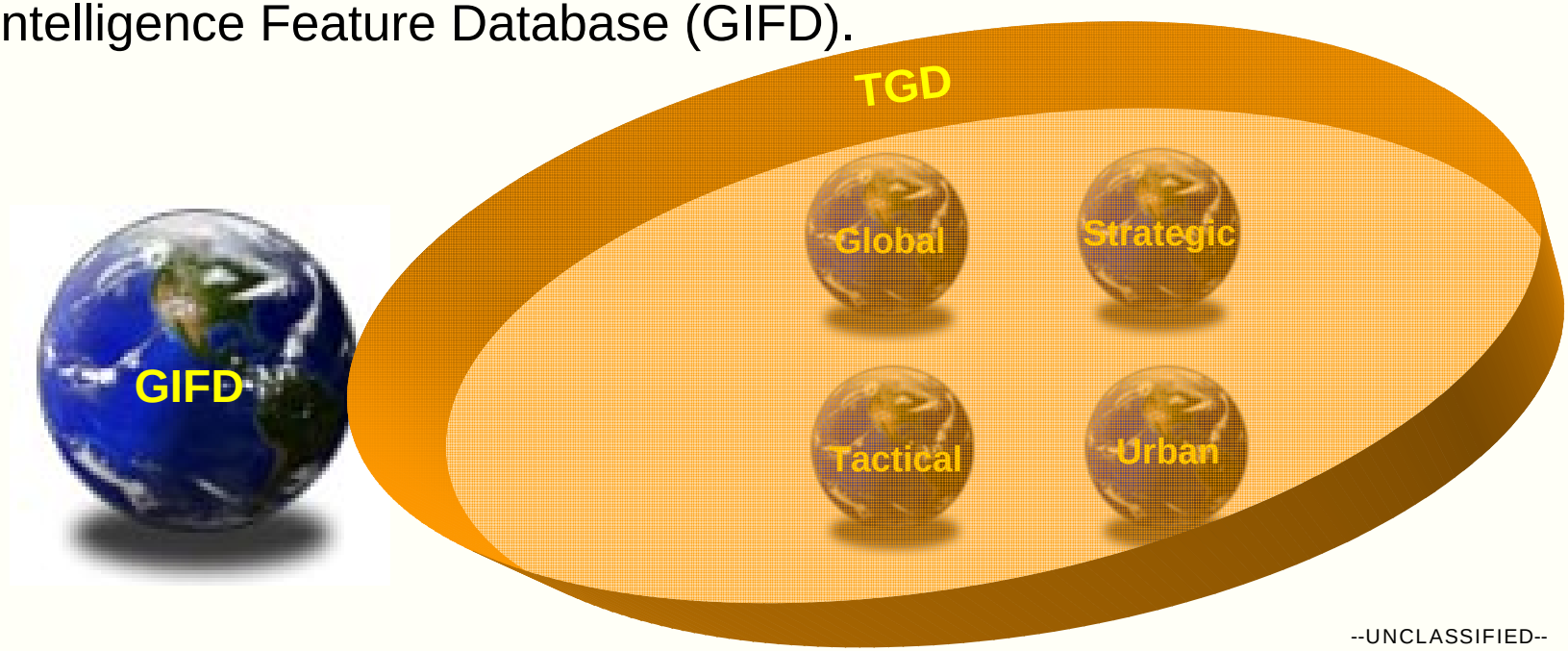
IPB: Intelligence Preparation of the Battlefield
EBA: Engineering Battlefield Assessment

What & Why of TGD

- Poor quality, no existing geospatial data cumbersome data format
- Lack of enterprise solution
- Rapid response in a changing world
- Reduction in man power
- Reduction in available resources
- Lack of standards (database, tools, TTPs)

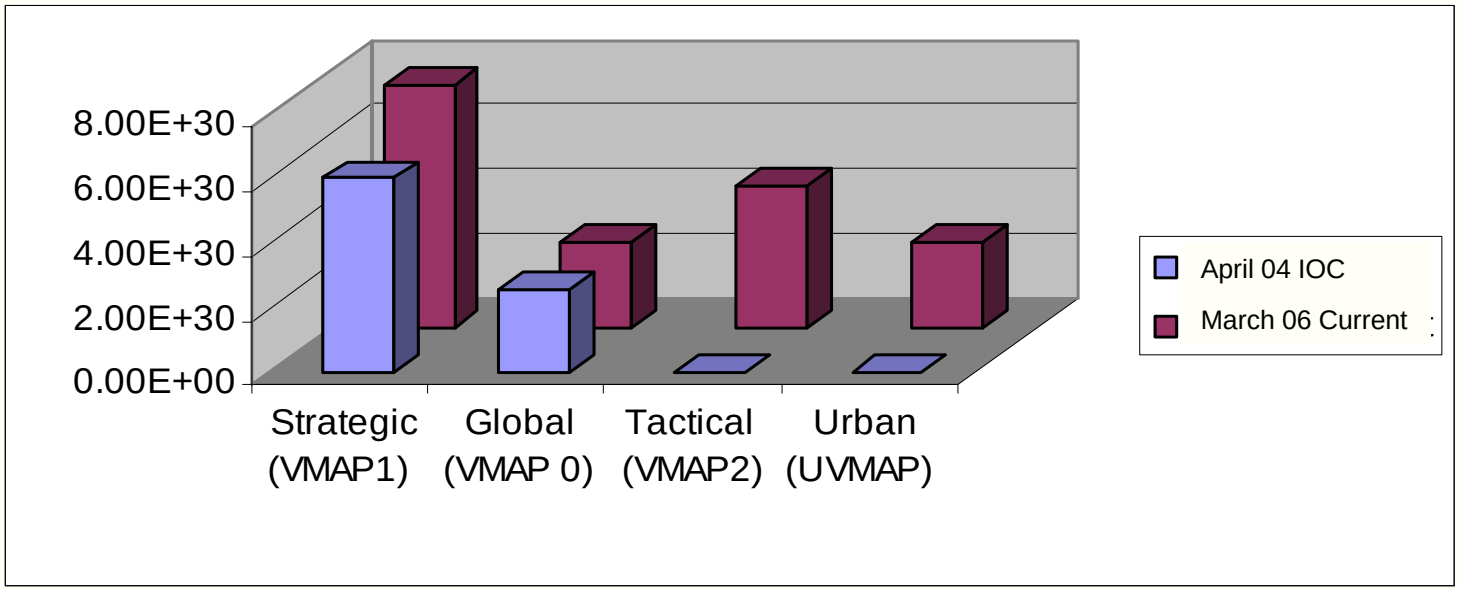
TGD Essentials

The TGD is a fusion of geospatial technologies, hardware, software, information, and processes. The brain of a geospatial system is the database model. The TGD is base on a scaled down version of the National Geospatial Intelligence Agency (NGA) Feature Attribution Coding Catalog (FACC) data model standard and NGA's Geospatial Intelligence Feature Database (GIFD).



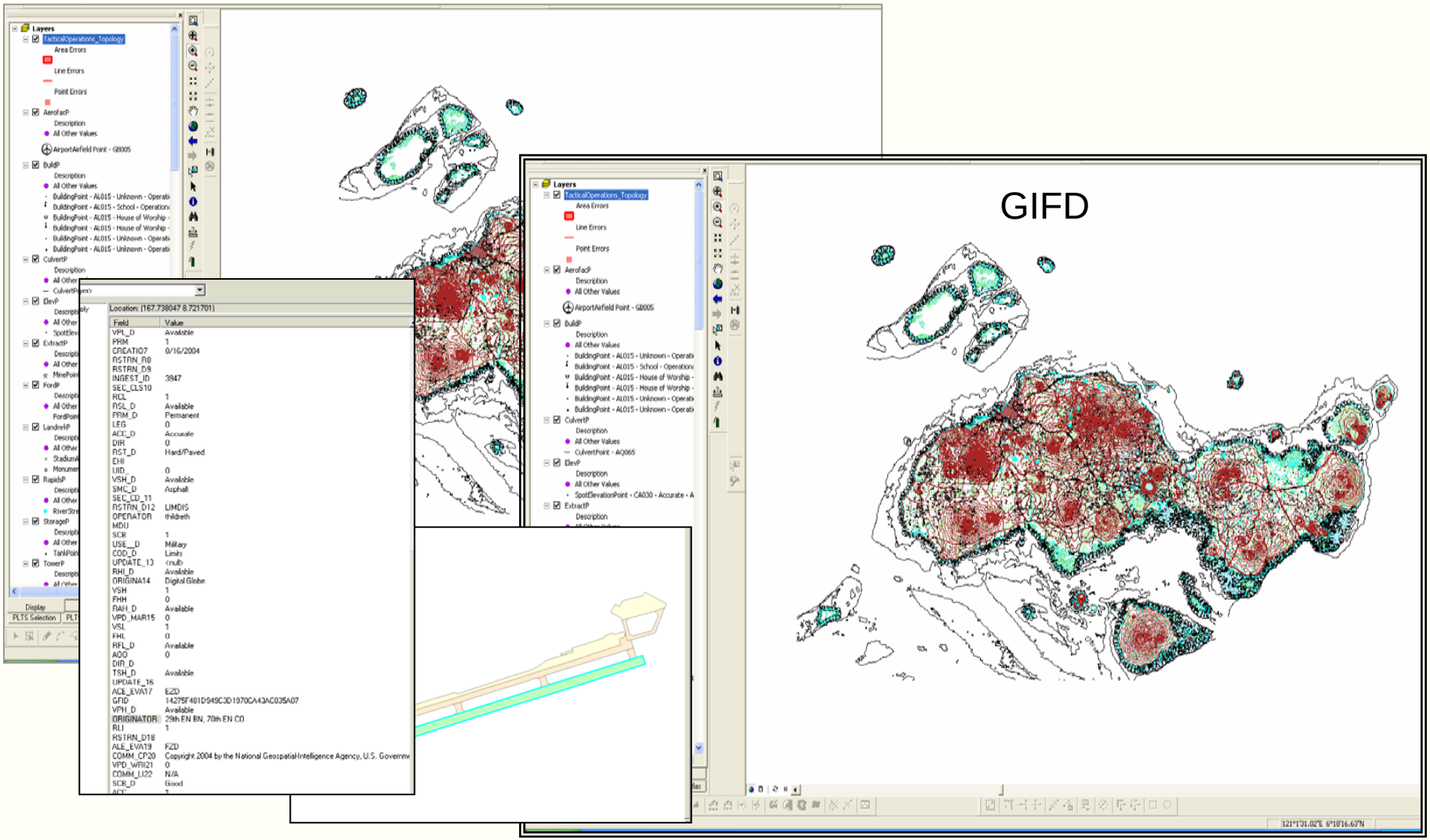
Geospatial Database Growth

IOC April 2004 to March 2006



- Strategic 6 GB - 7.5 GB
- Global 2.6 GB - 2.7 GB
- Tactical 120 MEG - 7.04 GB
- Urban 40 MEG - 305 MEG

USARPAC TGD Data to NGA GIFD



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TGD 3 Data model

TGD_v3_0_4_5_25JAN06_comments (2).xls [Read-Only]

	C	D	E
11	AIRPORT_RP_COORDP	AIRPORT_RP_COORDP	
12	AIRSPACEA	AIRSPACEA	
13		AQUEDCTA	
14	AQUEDCTL	AQUEDCTL	
15	AQUEDCTP	AQUEDCTP	
16	BARRIERL	BARRIERL	Add attributes for type of material - wood, steel, concrete, brick, block.
17	BERTHP	BERTHP	
18	BLUFFL	BLUFFL	
19	BNDL	BNDL	
20	BOTCHARP	BOTCHARP	
21		BRIDGEA	
22	BRIDGEL	BRIDGEL	
23	BRIDGEP	BRIDGEP	
24	BUILDA	BUILDA	BDB - Check FACC for attributes "agriculture" "fertilizer plant" AND "Nursery & Farm Supplies". Add attribute BFC116 "Factory". Need to look at BDB for attributes in dBankNAICS specifying type of bank. Consider adding "meeting place" as an attribute - BDB dEatAndMeetFACC1. Add attribute "Resturant" BFC057. Add attribute "University or College" BFC060; "Dormitory" BFC151; "Library" BFC128. Add attributes to BFC list for "Meeting Place" and "Pooling Station". Need attribute for "Gas Station" BFC054. Need to add BFC codes for "executive office", "Ministerial Office", "Human and Social Service Office", "Correctional Institution" from dGovernmentNAICS. Need to add attributes "Market" BFC051& "Shopping Center" BFC122. Need to add attributes "Commercial Building" BFC133 & some attribute for Newspaper & Broadcasting Building - see dMediaNAICS. Need to add "Nursing Facility" BFC109. Check Crop Production Farm AL015. BDB - add subclass "backup power or generator" AL015.
25	BUILDL	BUILDL	
26	BUILDP	BUILDP	
27	BUILTUPA	BUILTUPA	
28	BUILTUPP	BUILTUPP	
29	BUOYBCNP	BUOYBCNP	

Sheet1 / Sheet2 / Sheet3

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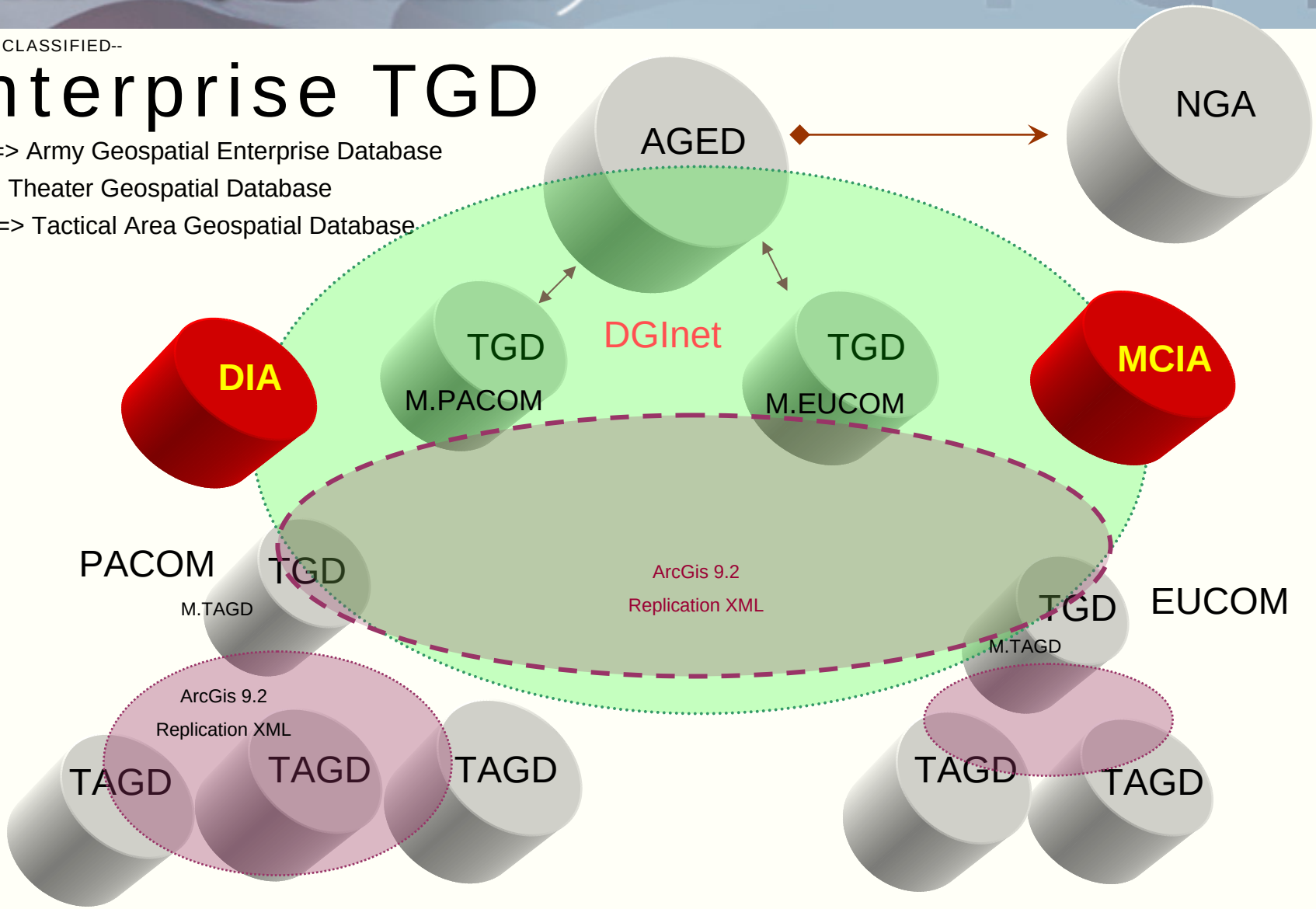
Enterprise TGD

AGED=> Army Geospatial Enterprise Database

TGD=> Theater Geospatial Database

TAGD => Tactical Area Geospatial Database



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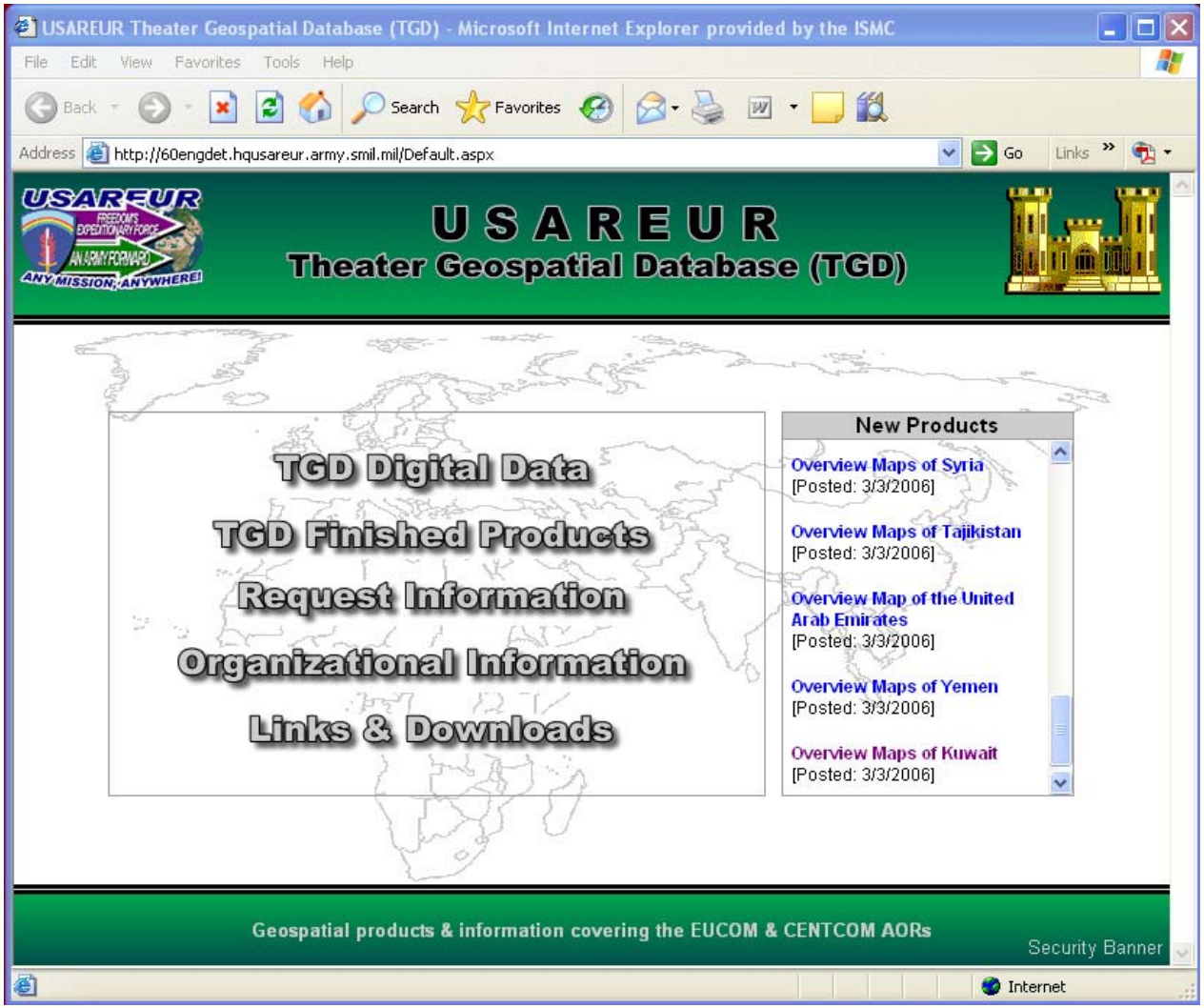
USAREUR TGD Web Site



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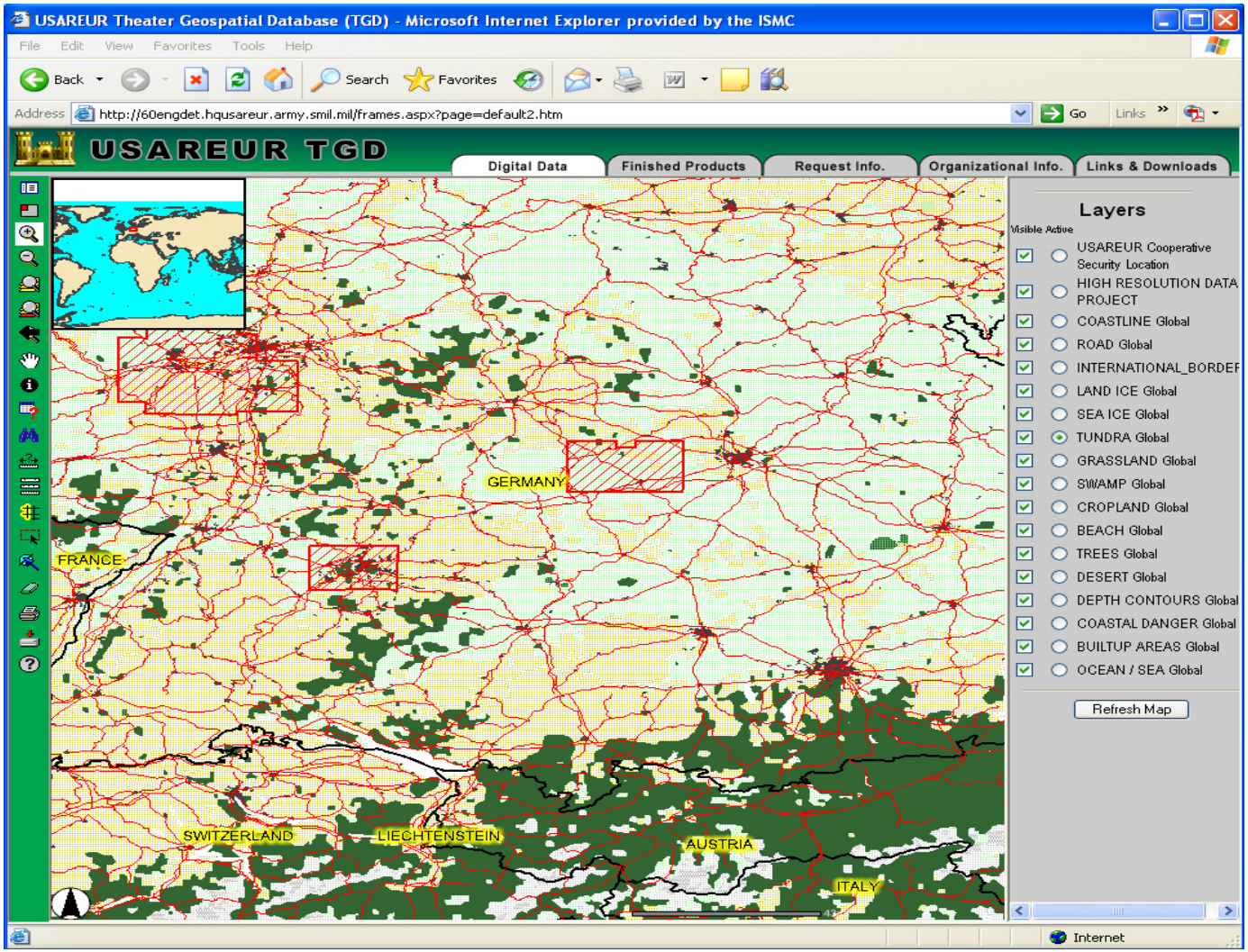
USAREUR TGD IMS



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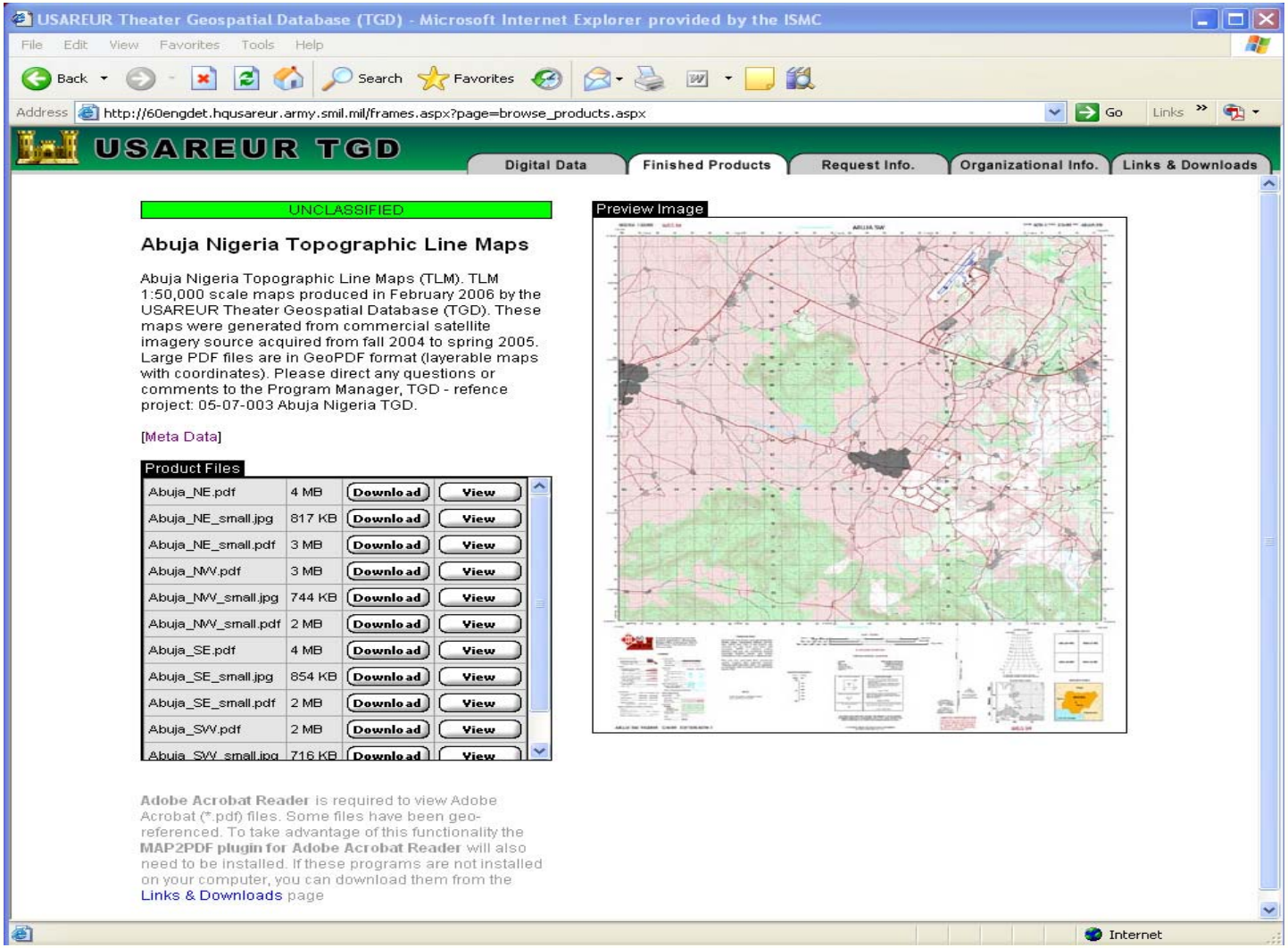
USAEUR TGD Products



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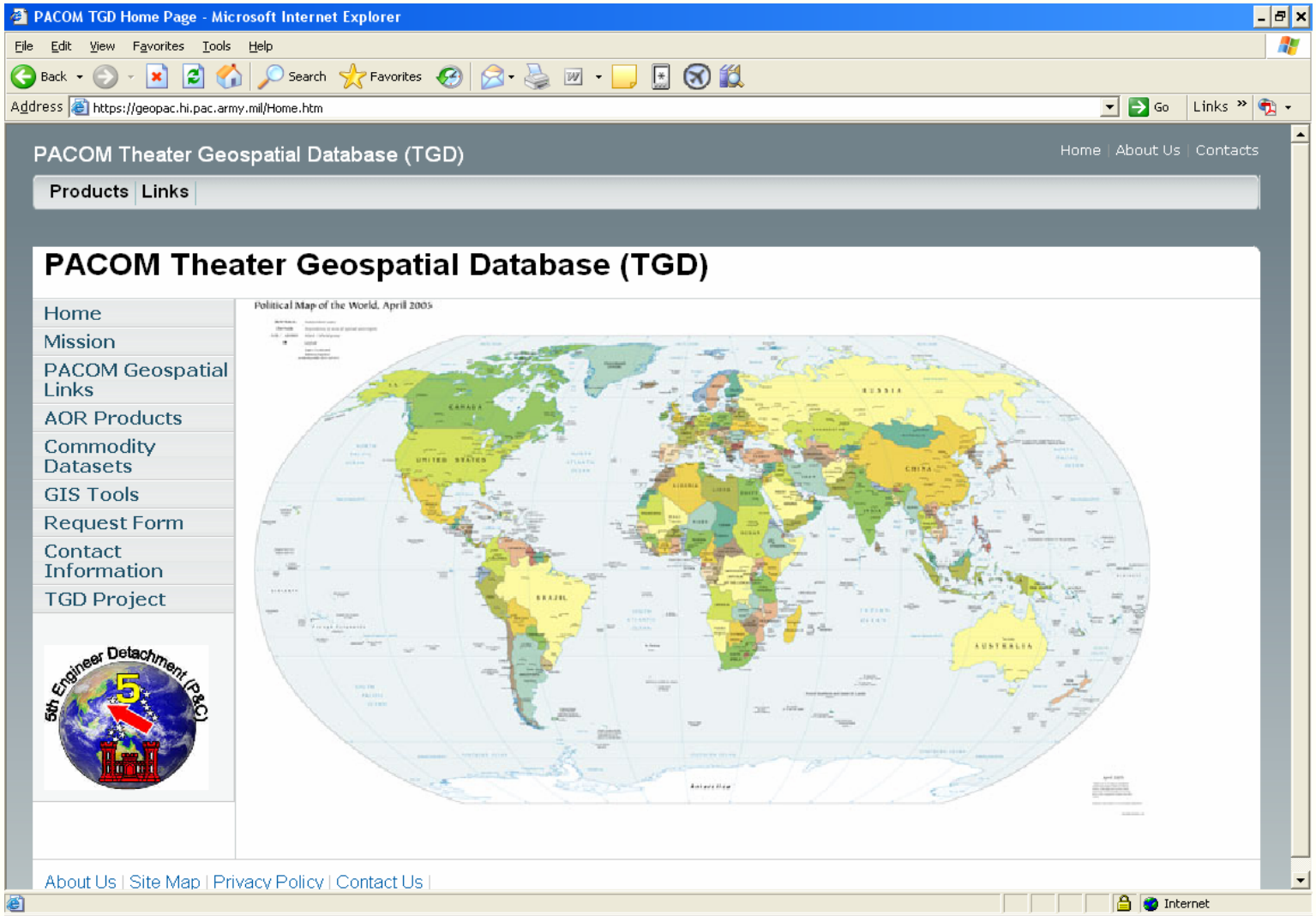
USARPAC TGD /NIPRNET



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From Concept to Reality

"Standing-up the TGD"

https://geopac.hi.pac.army.mil/

The "Front Door" of the TGD - NIPRNET

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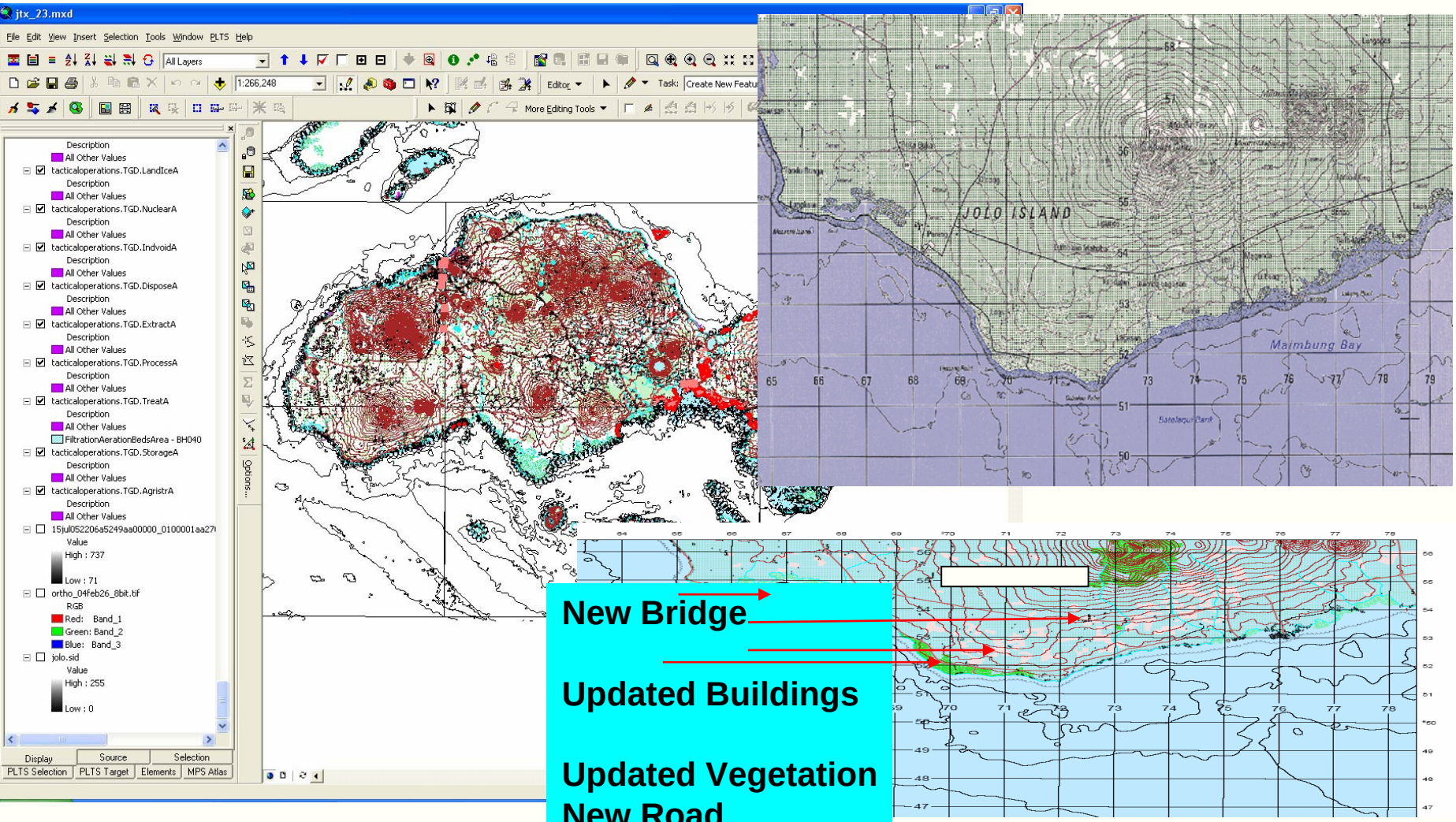
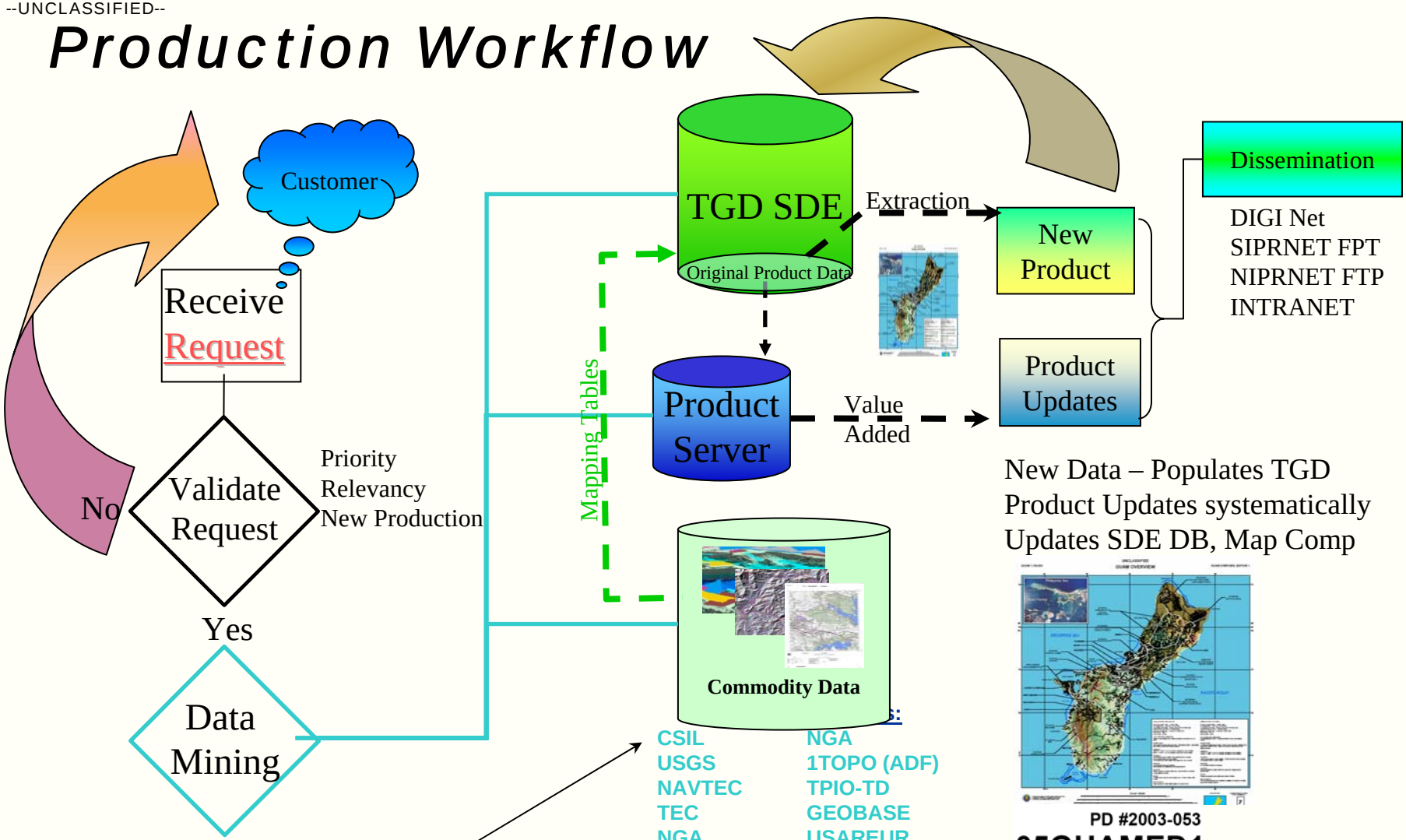
TGD at work


jtx_23.mxd
File Edit View Insert Selection Tools Window PLTS Help
JOLO ISLAND
Maimbung Bay
New Bridge
Updated Buildings
Updated Vegetation
New Road

Production Workflow



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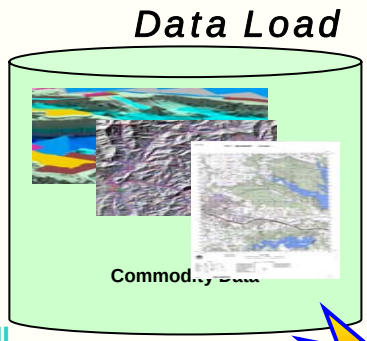
Data Model



- CSIL
- USGS
- NAVTEC
- HOST information
- GEOBASE
- NGAUSAREUR
- MARFORPAC
- TEC
- TPIO-TD
- 1TOPO (ADF)
- NGA

Mapping Tables

TGD SDE

FieldNames : Table

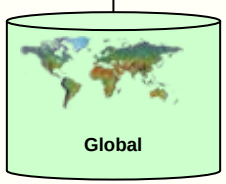
FieldID	InFieldName	OutFieldName	FeatureClass
5440	OBJECTID	OBJECTID	AerofacP
5441	Shape	Shape	AerofacP
5442	FCsubtype	FCsubtype	AerofacP
5443	gfid	gfid	AerofacP
5444	MDLink	MDLink	AerofacP
5445	f_code	f_code	AerofacP
5446	iko	iko	AerofacP
5447	nam	nam	AerofacP
5448	na3	na3	AerofacP
5449	use_	use_	AerofacP
5450	zv3	zv3	AerofacP
5222	OBJECTID	OBJECTID	AquedctL
5223	Shape	Shape	AquedctL
5224	FCsubtype	FCsubtype	AquedctL
5225	gfid	gfid	AquedctL
5226	MDLink	MDLink	AquedctL
5227	f_code	f_code	AquedctL
5228	exs	exs	AquedctL
5229	loc	loc	AquedctL
5230	Shape_Length	Shape_Length	AquedctL
5359	OBJECTID	OBJECTID	BarrierL
5360	Shape	Shape	BarrierL
5361	FCsubtype	FCsubtype	BarrierL
5362	gfid	gfid	BarrierL
5363	MDLink	MDLink	BarrierL
5364	f_code	f_code	BarrierL
5365	Shape_Length	Shape_Length	BarrierL
5177	OBJECTID	OBJECTID	BluffL
5178	Shape	Shape	BluffL
5179	FCsubtype	FCsubtype	BluffL
5180	gfid	gfid	BluffL
5181	MDLink	MDLink	BluffL
5182	f_code	f_code	BluffL
5183	Shape_Length	Shape_Length	BluffL
5874	OBJECTID	OBJECTID	BndvoidA
5875	Shape	Shape	BndvoidA
5876	FCsubtype	FCsubtype	BndvoidA
5877	gfid	gfid	BndvoidA
5878	MDLink	MDLink	BndvoidA
5879	f_code	f_code	BndvoidA
5880	vca	vca	BndvoidA
5881	Shape_Length	Shape_Length	BndvoidA
5882	Shape_Area	Shape_Area	BndvoidA

Record: 1 of 748

Sheet View

TGD Data (Data Model)
VMAP Various Scales
Commodity Data

Data Models



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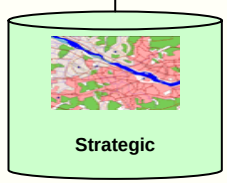

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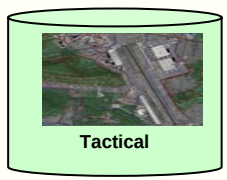
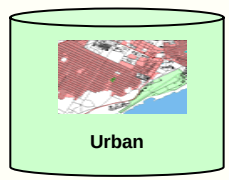


•1:100K-1;50



•25k- 7.5K

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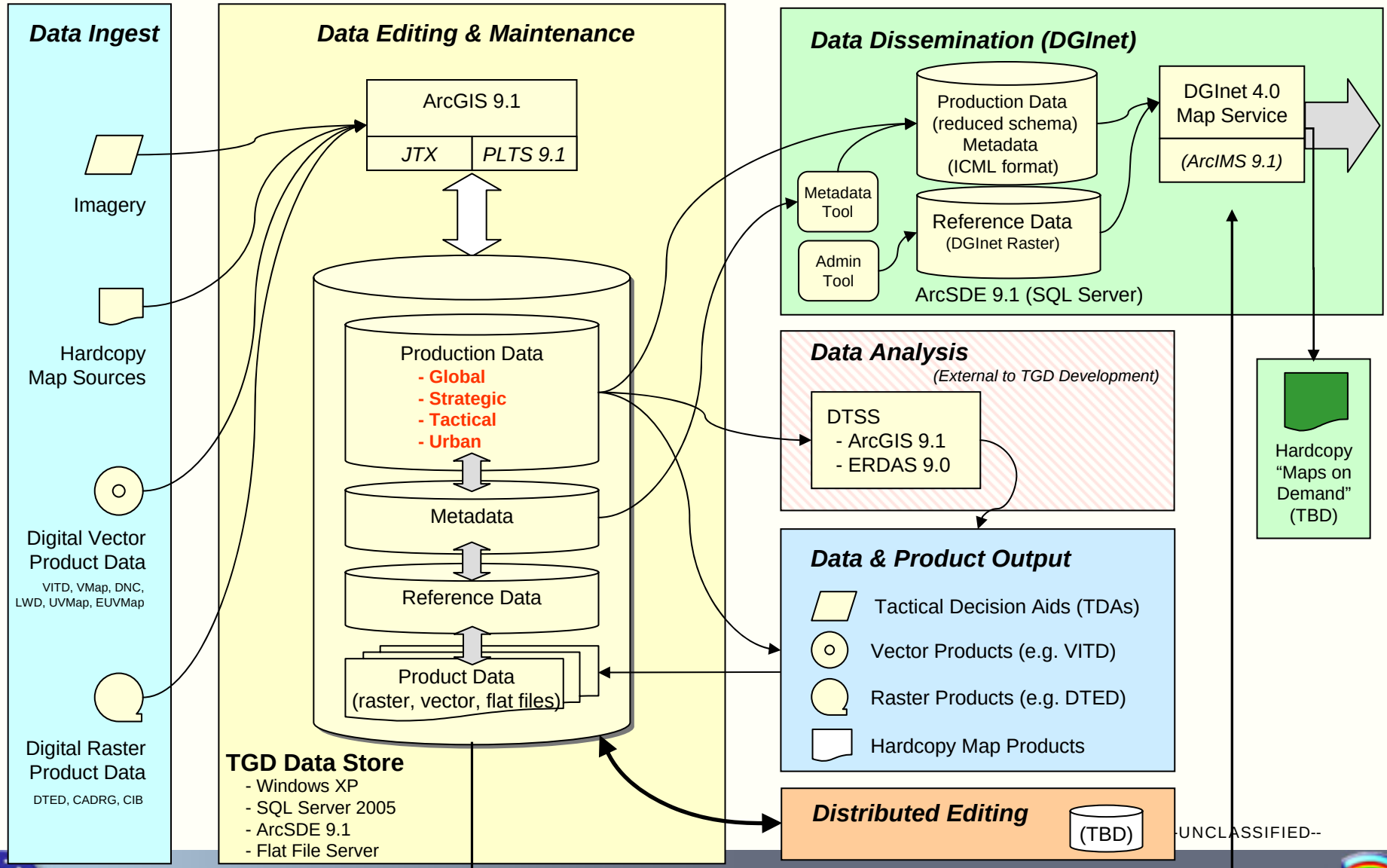
TGD Functional Architecture



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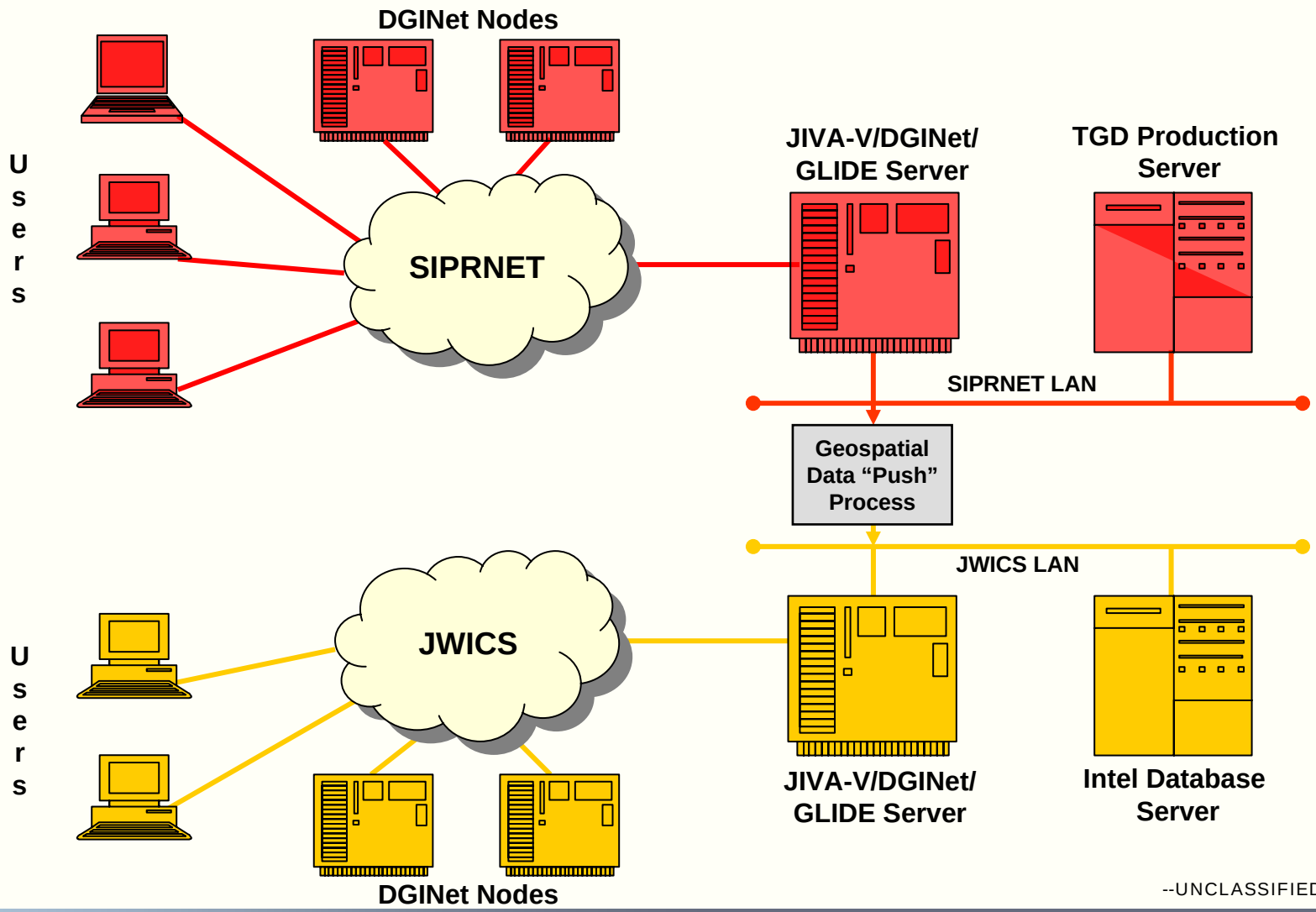
TGD Architecture



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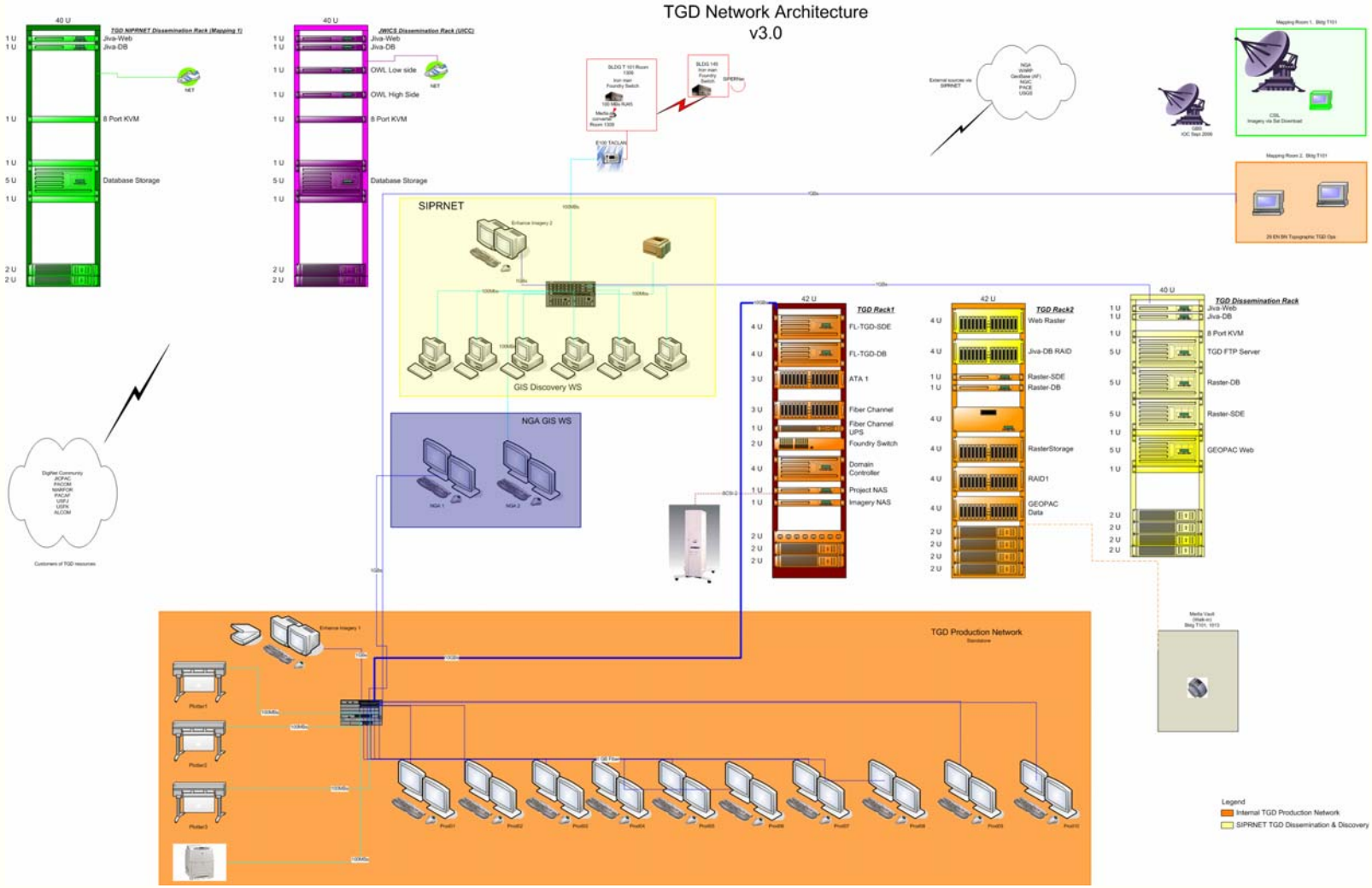
USARPAC TGD Network



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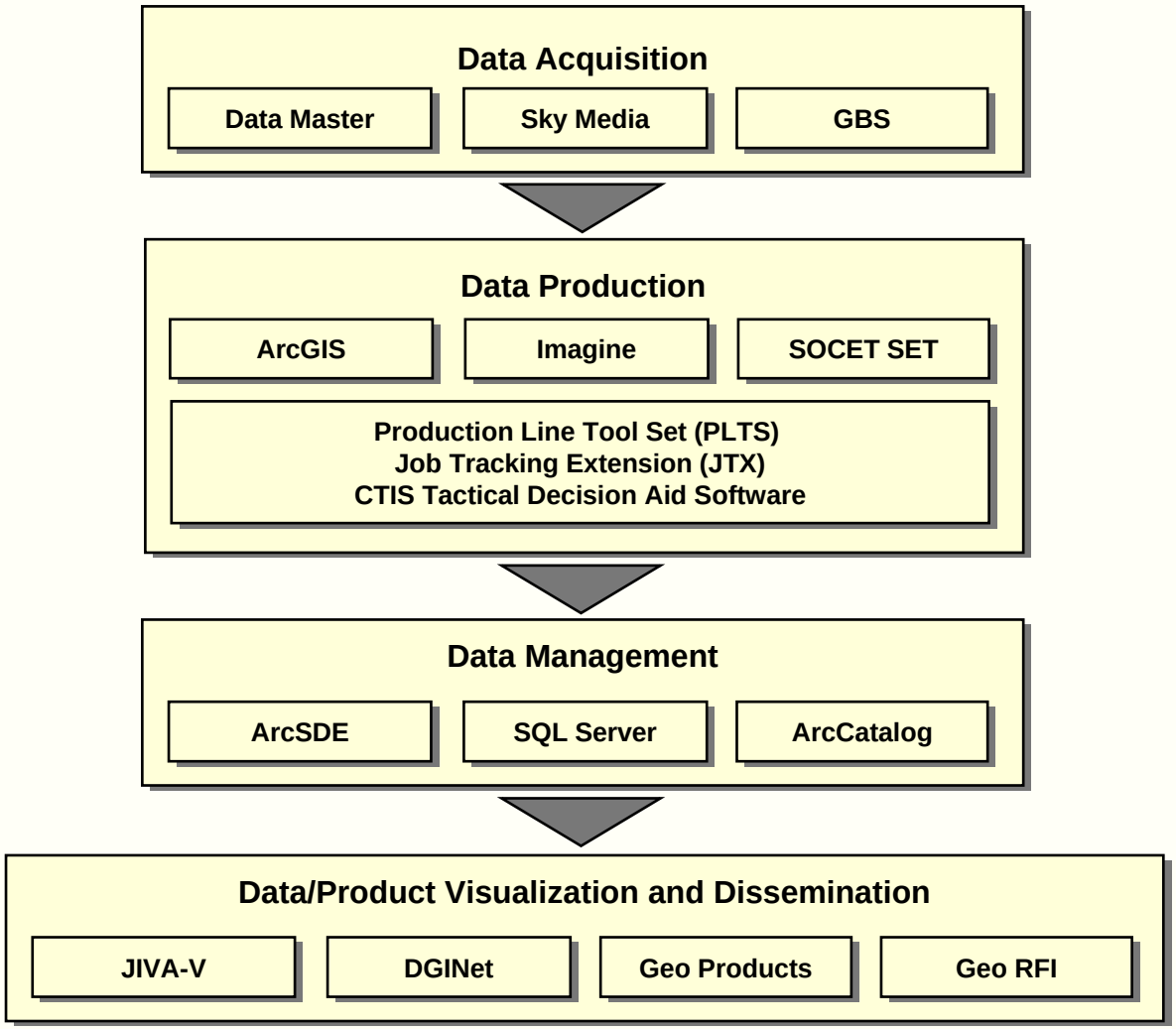
TGD Software



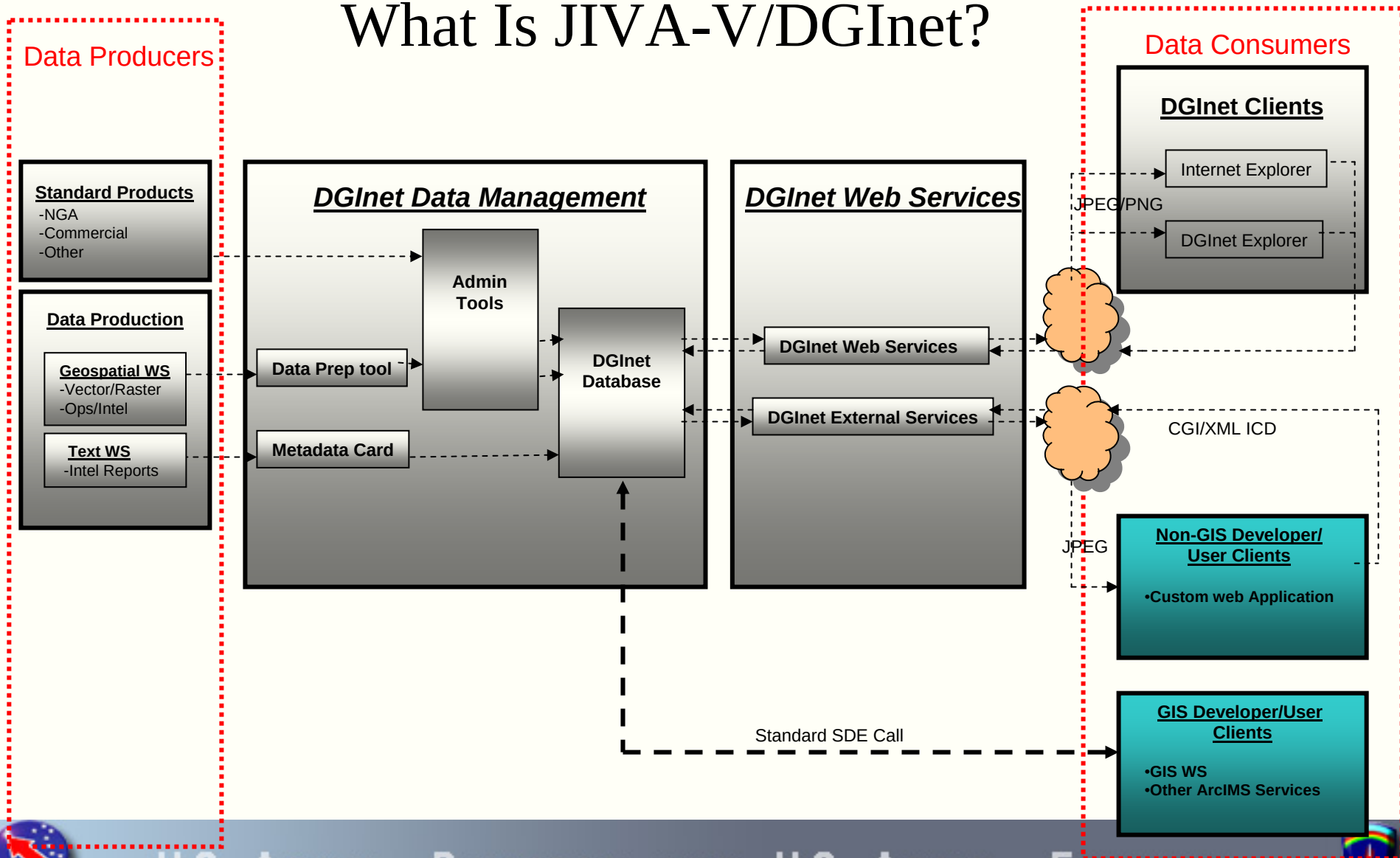
Enterprise Component

- **Joint Intelligence Virtual Architecture – Visualization (JIVA-V): Provides capability to quickly and easily find, display, overlay and fuse geospatial data from multiple sources.**

- **Distributed Geospatial Intelligence Network (DGINet): Provides analysts the capability to rapidly locate and display data residing locally or at remote sites world-wide.**

- **Geographically Linked Information Dissemination Environment (GLIDE): Provides the capability to quickly locate, display and download geospatial products from anywhere on the network.**

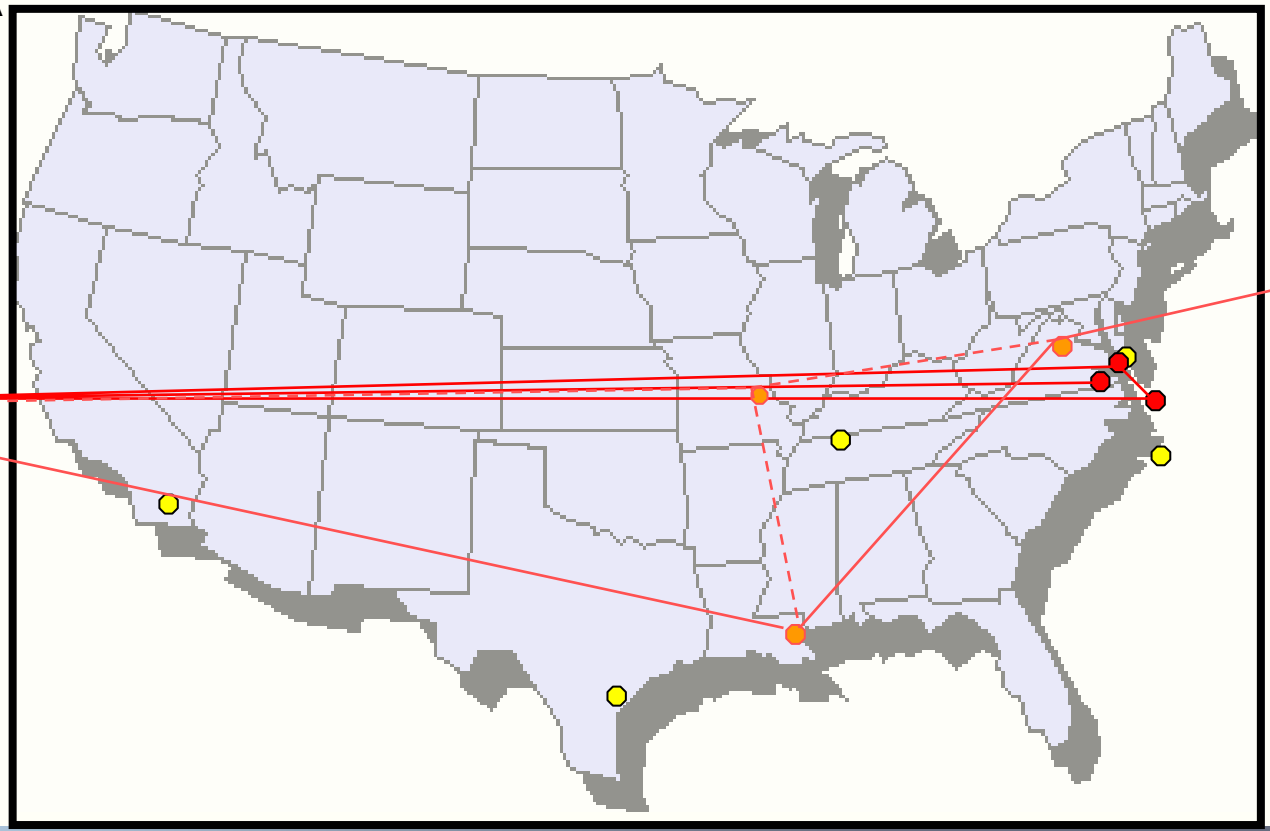
What Is JIVA-V/DGInet?



DGInet Operational SIPRNET Nodes

SIPRNET2 Active

- USARUR
- USARPAC
- NAVO
- DTRA
- NGA*



SIPRNET1 Active

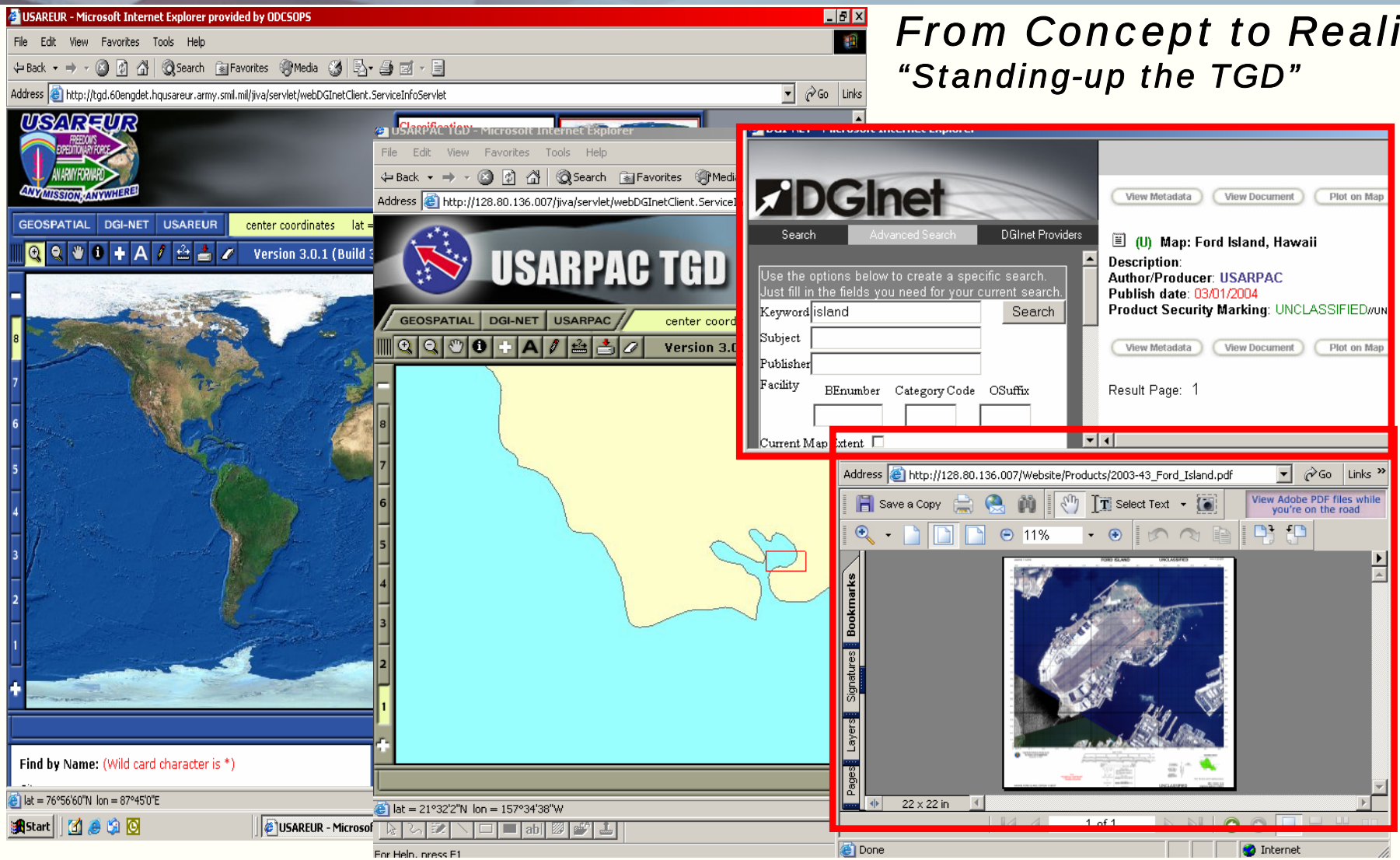
- USPACOM
- JFIC
- MCIA (GLIDE)
- NGIC (Prototype)

SIPRNET Planned

- DIAC
- NGIC (Operational)
- 1st MEF
- 2nd MEF
- 3rd MEF
- USTRANSCOM
- JIOC (AIA)

From Concept to Reality

"Standing-up the TGD"



The "Front Door" of the TGD - SIPRNET

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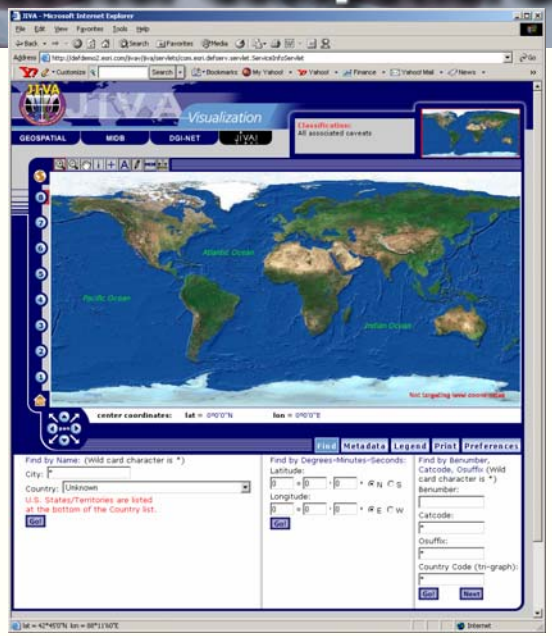
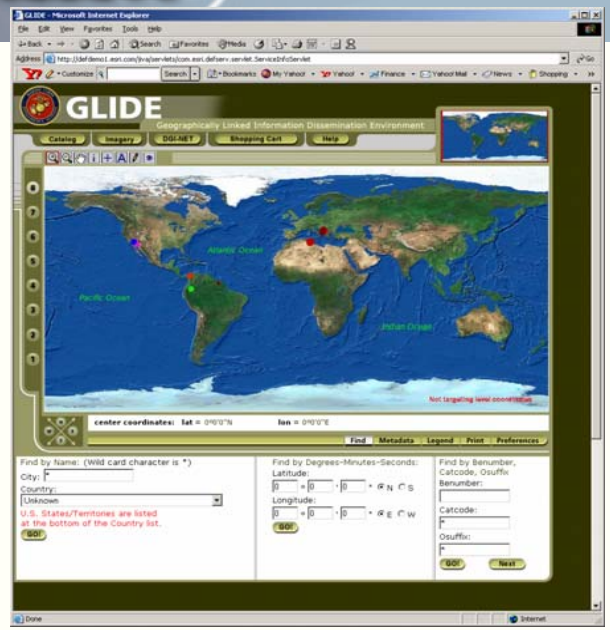
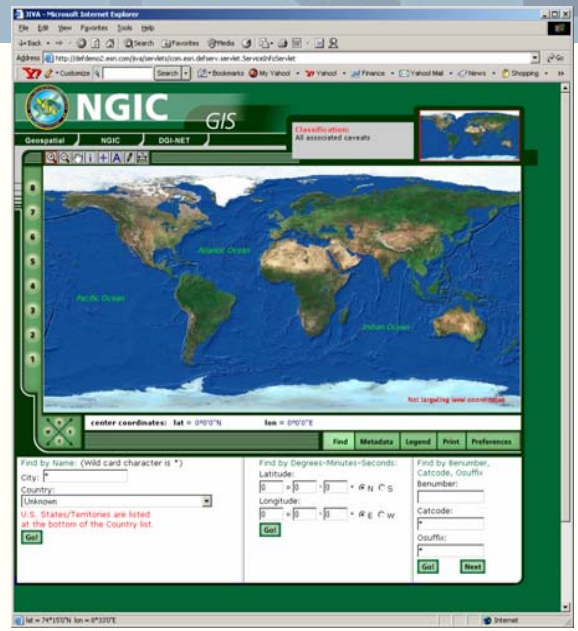
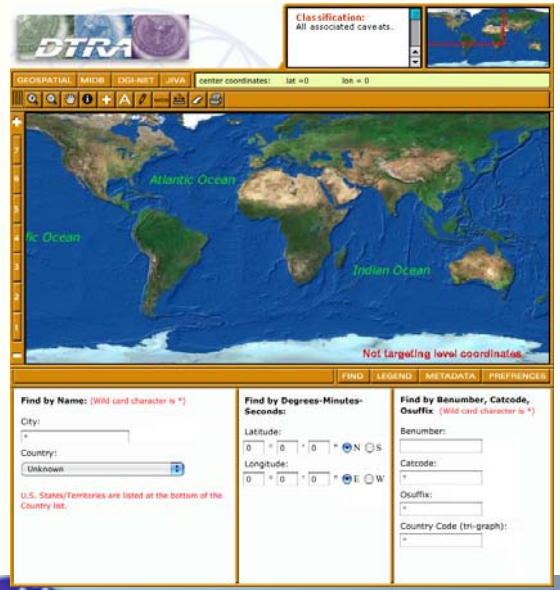
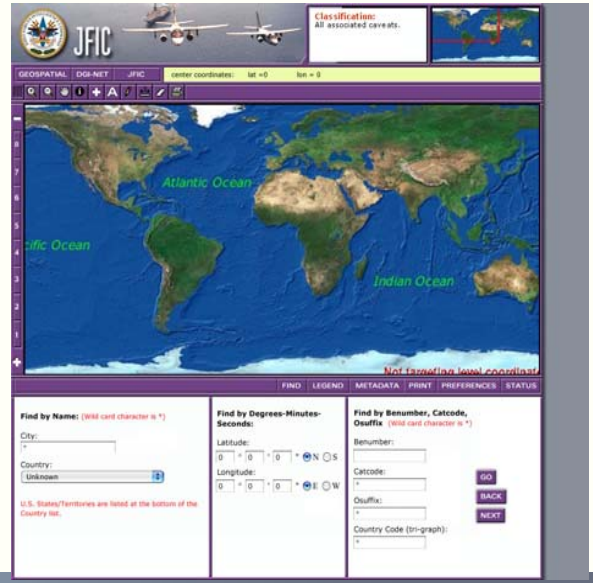
DGInet Data Providers









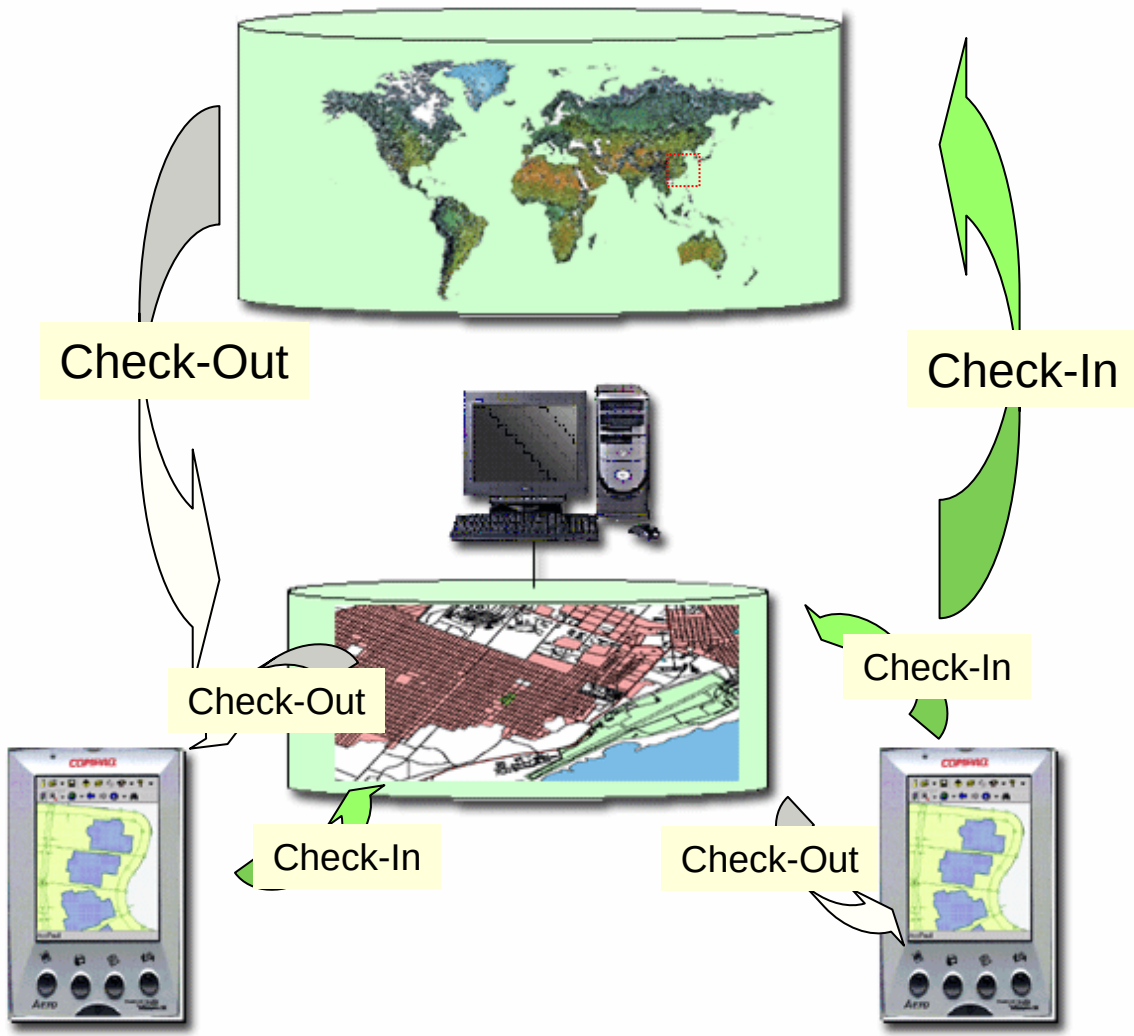


Disconnected Editing

TGD forms Initial “map” baseline

Checkout mission dataset

Check-outs To individual ArcPad devices



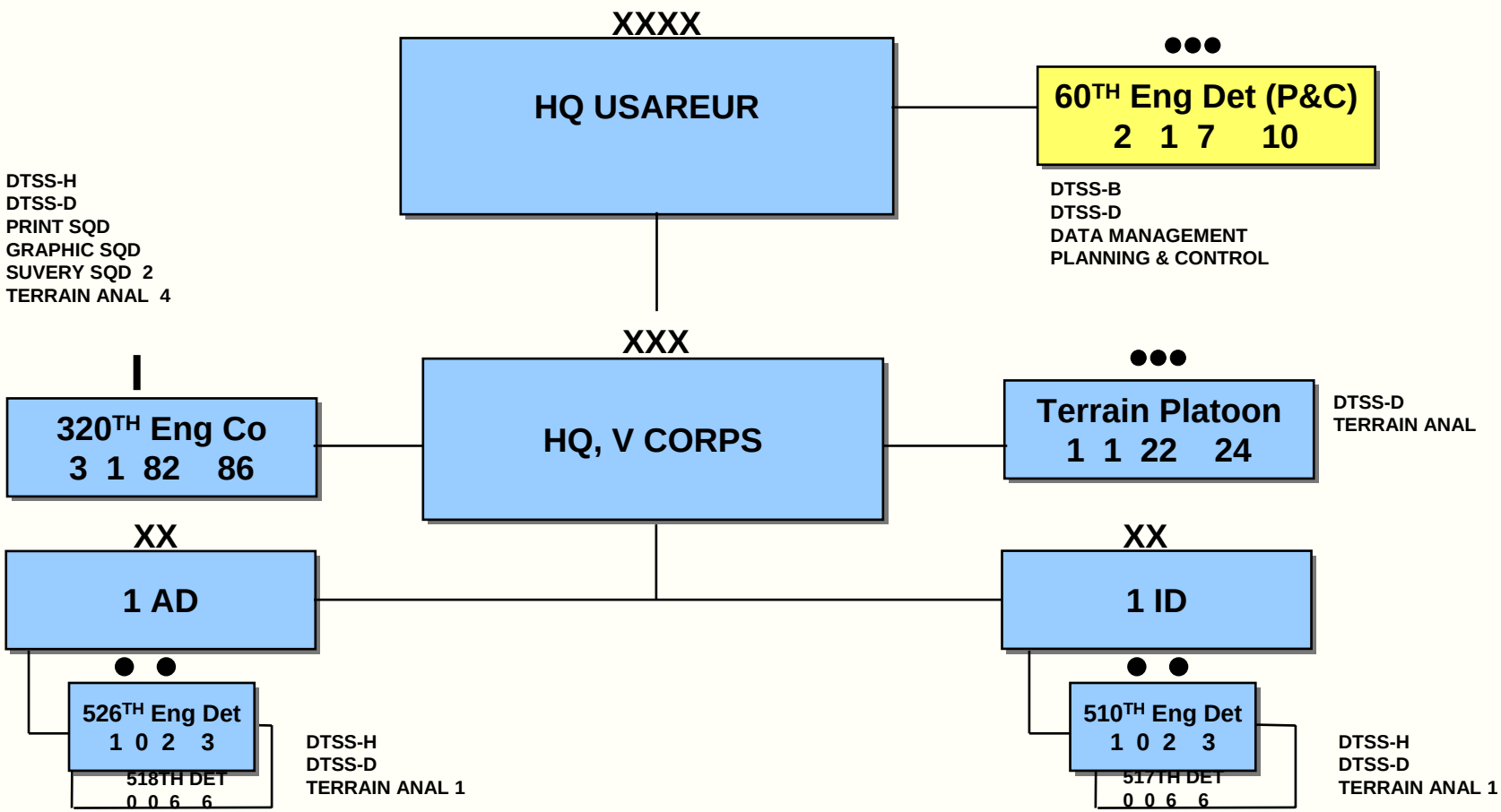
Check-In Data to TGD

U.S. Army Transformation
5th EN DET (P&C) to 5th GPC

- 5th EN DET, 11 Mil 1DA Civ, 5 contractors
- 5th GPC, Oct 2007 27 Mil ? DA Civ, ? contractors

- 60th EN DET
- 60th GPC, Spring 2007

USAREUR Organization



Future Enhancements

- **TGD 3**
  - Raster Geospatial Database
  - Glide features (Zip and Ship)

- **TGD 4**
- Improved database performance
- Automatic Feature extraction
- Automatic Map generation
- Automatic Feature change notification

Points of Contact

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TGD DGInet (SIPRnet):
http://tgd.60engdet.hqusareur.army.smil.mil/jiva/start.html

USARPAC

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NGA (USARPAC-G2)
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TGD DGInet (SIPRNET): http://128.80.136.007/jiva/start.html
SIPRNET: http://128.80.136.192
NIPRNET: https://geopac.hi.pac.army.mil/

TEC

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Glossary

- LINCS – Long-range Information Networked Communications Services
- TGD – Theater Geospatial Database
- Jiva-V - Joint Intelligence Virtual Architecture – Visualization
- DGINet - Distributed Geospatial Intelligence Network
- GLIDE - Geographically Linked Information Dissemination Environment
- DTSS - Digital Topographic Support System
- NGA - National Geospatial-Intelligence Agency
- IPB - Intelligence Preparation of the Battlefield
- EBA - Engineering Battlefield Assessment

Attribution

The following people took part in the ongoing development and implementation of the TGD:

- USAREUR – Todd M. Minnich , Ron Bijeau, Kristin A. Fishburn
- USARPAC – Dr. Eugene Bingue, MAJ Curtis Edson , CW3 Loren Small, Ryan Kakazu
- ESRI – Jim Ciarrocca, John Grammer, Jack Miller
- USATEC – Dennise Hovanec, Mark Hainsey
- DIA – Terry Busch

Questions

"A map says to you, Read me carefully, follow me closely, doubt me not, I am the earth in the palm of your hand"

Beryl Markham -- aviator and author